

REMARKS

This Application has been carefully reviewed in light of the Office Action mailed December 3, 2004. At the time of the Office Action, Claims 1-10 were pending in this Application. Claims 1-10 were rejected.

Claims 4-10 have been cancelled. Claim 1 has been amended to further define various features of Applicant's invention. Claims 11-13 are requested to be added.

Rejections under 35 U.S.C. § 102

Claims 7-10 were rejected by the Examiner under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,321,332 issued to Minoru Toda ("Toda").

Claims 7-10 have been cancelled.

Rejections under 35 U.S.C. §103

Claims 1-6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Toda in view of U.S. Patent 5,559,387 issued to Henry R. Beurrier ("Beurrier"). Applicant respectfully traverses and submits that the cited art combination does not render the claimed embodiment of the invention obvious.

Claim 1 has been amended to recite additional limitations of the invention not taught or suggested by the cited references. Many of the amendments make clear that the transducer is especially suited for an ultrasonic resonant frequency and for high bandwidth at such frequencies.

Support for the ultrasonic operating characteristic of the transducer is on page 4, first paragraph. Also, the operating frequencies ranges given as examples on page 9 are primarily ultrasonic.

The piezoelectric film of Claim 1 has three layers. These are illustrated in FIGURE 3 as two conductive layers 31b that sandwich a polymer layer. When the piezoelectric film is wound, an elastomer layer 33 prevents the conductive layers 31b from being laid against each other.

Claim 1 now recites specific features of the elastomer layer 33. It is described on page 6, third paragraph, and on page 9, first paragraph. The example materials have a lower

modulus of elasticity than the piezoelectric film materials. Layer 33 is described as being "soft", and it is well known that the speed of sound is slower in soft materials like rubber and faster in stiff materials like steel. An example of the difference between the softness of layers 33 and 31, and hence the speed of sound through these layers, is given on page 9, lines 2 - 5.

The lower sound speed through layer 33 contributes to a lower resonant frequency, as illustrated by example on page 9. The examples show that by selecting an appropriate material for layer 33 and an appropriate width of the winding, ultrasonic frequencies can be achieved.

Claim 1 has been amended to recite a rigid backing, which halves the resonance frequency. Even so, the example frequencies of the transducer on page 9 are well within ultrasonic ranges.

Toda does not teach using a different material between the conductive layers of the piezoelectric film. In Toda, two piezoelectric films are wound, and a conductive layer of one lies against a conductive layer of the other. Toda does not teach using an additional elastomer layer to lower the resonant frequency of the winding.

Beurrier does teach a rubber fill layer 43 between the layers of piezoelectric film (Col. 4, lines 53 - 59). However, Beurrier does not teach or suggest using this layer to lower the resonant frequency of the winding. In fact Beurrier teaches away from this aspect of the present invention by stating other purposes for the fill layer on Col. 5, lines 8-11. The adhesive of Beurrier would inhibit the beneficial operation of the present invention.

In sum, neither Toda nor Beurrier teach the use of an additional layer of different material, between the piezoelectric film layer, which decreases the resonance frequency from that which would occur if the winding were entirely made from the piezoelectric film. They do not teach or suggest that this material can be used to lower the desired resonant frequency of the device by lowering the average sound velocity through the winding.

Claims 11 -13

Claims 11 - 13 are supported by the specification as follows:

Claim 11	page 8, paragraph 2
Claim 12	page 9, first paragraph, lines 2-5
Claim 13	page 9, last paragraph

CONCLUSION

Applicant has made an earnest effort to place this case in condition for allowance in light of the amendments and remarks set forth above. Applicant respectfully requests reconsideration of all pending claims as amended.

Applicant encloses a Petition for Extension of Time (2 months) and a check in the amount of \$450.00 for the extension fee. The Commissioner is hereby authorized to charge any additional fees necessary or credit any overpayment to Deposit Account No. 50-2148 of Baker Botts L.L.P.

If there are any matters concerning this Application that may be cleared up in a telephone conversation, please contact Applicant's attorney at 512.322.2634.

Respectfully submitted,
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